

HOW I DO IT

Constant Landmark for Simplified Identification of the Long Thoracic Nerve During Mastectomy

VIJAY P. KHATRI, MD¹ AND MANUEL H. ESPINOSA, MD^{2*}¹Roswell Park Cancer Institute, Buffalo, New York²Easton Hospital, Easton, Pennsylvania

INTRODUCTION

When performing modified radical mastectomy, the two nerves of particular interest to the surgeon are the long thoracic (LT) nerve and the thoracodorsal nerve, which need to be preserved. Among the axillary lymphatic and fatty content, identification of the long thoracic nerve often can be difficult for the surgical trainee. Surgical textbooks provide cursory descriptions of the important steps in identifying the nerve. We describe a series of detailed steps and the use of a constant anatomical landmark that has allowed us to identify the LT nerve with relative ease.

SURGICAL ANATOMY

The long thoracic nerve arises from the fifth, sixth, and seventh roots of the brachial plexus. It is formed over the first digitation of the serratus anterior and runs vertically downward to enter the axilla. In the proximal part of the axilla, the LT nerve lies superficial to the serratus anterior fascia and is embedded within the fatty tissue. The LT nerve then travels medially and approximately at the level of the 4/5th intercostal space, it pierces this fascia to lie on the surface of the serratus anterior muscle. Along its entire course, the nerve lies behind the midaxillary line, i.e., posterior to the lateral cutaneous branches of the perforating intercostal nerves and vessels. This relationship serves as the reference landmark we use in locating the nerve during axillary dissection.

TECHNIQUE

Once the superior and the inferior breast flaps are created, the pectoralis fascia is dissected from the underlying pectoralis musculature. This dissection proceeds in the lateral direction until the lateralmost border of pectoralis major muscle is identified. The overlying fascia is incised to allow identification of the pectoralis minor and to enter the axilla. The axillary vein is identified and the venous tributaries are exposed, ligated, and divided. As

the breast tissue is elevated from the lateral chest wall, the lateral intercostal perforator vessels/nerve are invariably encountered. These are clamped and ligated carefully, although we attempt to preserve the intercostobrachial nerve if possible. Since we use these perforators as our reference landmark for identifying the LT nerve, ligating with silk allows them to be readily visualized during dissection. We continue to sweep the breast tissue off the serratus anterior fascia but do not violate it, which therefore helps to protect the nerve. In fact, at this stage, the glistening serratus anterior fascia often becomes folded on the chest wall and to the untrained eye, it can be mistaken for the long thoracic nerve (Fig. 1). Instead

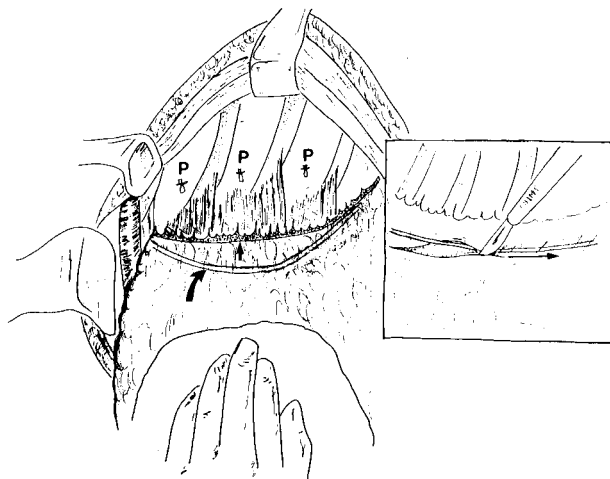


Fig. 1. High in the axilla, the long thoracic nerve (curved solid arrow) can be seen lying away from the chest wall. Distally it can be seen traveling medially towards the chest wall to pierce the serratus anterior fascia. Small solid arrow points to the folded serratus anterior fascia. **P:** Lateral thoracic perforators (1st, 2nd, and 3rd). **Inset:** Adventitial layer is being incised lateral to the long thoracic nerve.

Correspondence to: Easton Hospital, 250 South 21st Street, Easton, PA 18042.

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of searching for the LT nerve on the lateral chest wall where it lies snugly against the serratus anterior muscle [1] and prone to injury, we begin identifying it high in the axilla. Here, it can be found embedded within the axillary tissue and lying 1 cm away from the chest wall, since it is still superficial to the serratus anterior fascia (Fig. 1). The overlying thin layer of adventitia is incised lateral and parallel to the LT nerve thus, freeing the nerve, which can then be pushed medially towards the chest wall (Fig. 1 inset).

COMMENT

Preservation of the nerves in the axilla is important in order to obtain good functional results. Using the anatomical landmarks described, we prospectively examined 50 consecutive mastectomies. The LT nerve was consistently present 3 cm and 4 cm posterior to the second and third lateral intercostal perforators, respectively (Fig. 2). A review of 1,000 mastectomies performed during the last 20 years revealed no incidence of winged scapula. We have never needed to pinch the nerve or use the nerve stimulator as this often provides a false sense of security due to the effects of paralyzing agents or because the nerve can become fatigued. Being familiar with the regional anatomy is safer than utilizing accessory instruments for identifying important structures. We feel that this method of identifying the LT nerve high in the axilla would be a valuable guide to surgical trainees.

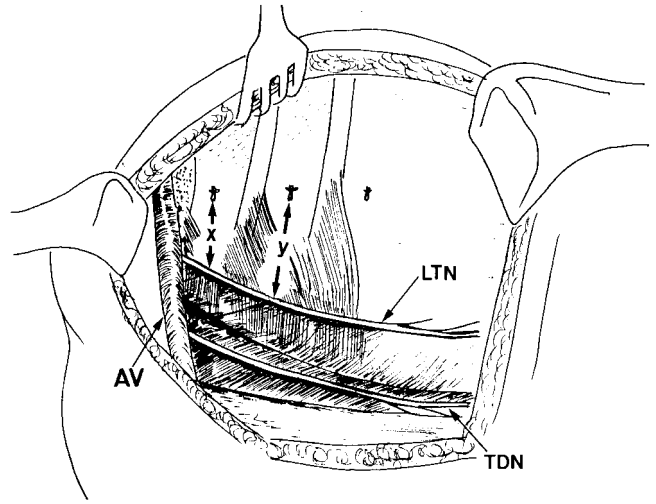


Fig. 2. View of lateral chest wall at completion of mastectomy, illustrating the relationship of the long thoracic nerve to the lateral thoracic perforators **X** = distance between the long thoracic nerve and the second lateral intercostal perforator, **Y** = distance between the nerve and the third lateral intercostal perforator. **LTN**: Long thoracic nerve, **TDN**: Thoracodorsal nerve, **AV**: Axillary vein

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REFERENCES

1. Last RJ: "Anatomy—regional and applied," 7th ed. Edinburgh: Churchill Livingstone, 1984:59,108.